

## ON SOME SYNGNATHIDS ("PIPE FISH") FROM CEYLON.

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(With one Plate.)

SYNGNATHIDS or pipe fishes are known to inhabit the fresh waters of East Africa as well as of continental India, but, strange to say, not as yet from Ceylon. Last summer (1909) I determined to investigate some Ceylon rivers with reference to the occurrence of Syngnathids, with the result of finding four species, viz., *Microphis brachyurus*, Bleeker, *Doryichthys cunculus*, Ham.-Buch., *Doryichthys ocellatus*, n. sp., and *Syngnathus spicifer*, Rüpp., var. *djarong*, Bleeker.

A review of all Syngnathids hitherto observed in Ceylon may be combined with the description of the species mentioned above; further investigation certainly will lead to the discovery of many more, especially marine species.

*Gastrotokeus*, Kp.

Brood organ of male abdominal, not covered by cutaneous folds. Eggs isolated in open cutaneous cells. Upper as well as lower lateral edges of trunk and tail continuous; middle lateral edges of trunk nearly or entirely reaching upper ones of tail behind the dorsal fin. Interstitial scutella and lateral line absent. Dorsal, anal, and pectoral fins (referred to as D, A, and P) present, caudal fin (C) absent; tail prehensile. Trunk much depressed, its ventral surface bordered by middle lateral edges.

1. *Gastrotokeus biaculeatus*, Bl.

Kaup, 1856, p. 19; Duméril, 1870, p. 528; Günther, 1870, p. 194; Day, 1878, p. 681, Pl. 174, fig. 5; Day, 1889, p. 467, fig. 167.

*Syngnathus blochii*, Bleeker, 1853, p. 24.

Truncal annuli (abdominal plus caudal) 15-18 plus 40-55. Annuli below dorsal fin (annuli subdorsales) 0-2 plus 8-10. Dorsal rays (D) 37-47. Anal rays (A) 4-5. Pectoral rays (P) 19-23. Frequently with numerous short immovable cutaneous appendages, similar to algæ. Chin with two simple or little ramified short movable tentacles of reddish-brown colour. Anus papilliferous. Eggs rather large, ovoid, generally in 8 longitudinal and 23-28 transverse rows. Total length up to 25.7 cm. Mature males 16.4 to 25.7 cm.

Colour during life grayish to sea-green; edges of body with indistinct reddish blotches. Small round dark blue dots, becoming brown in spirit, ventrally along the middle lateral edges of trunk.

Living between the weeds of a *Zostera*, sp., the leaves of which equal in breadth that of the animal, attached to their stems by means of the prehensile tail, the head erect, and therefore not easily visible. The decaying leaves of the *Zostera* are covered with small mucous gray algæ, which are strikingly similar to the cutaneous appendages of the fish. Slowly and clumsily swimming.

*Distribution*.—From East Africa to Polynesia. In the Colombo Museum there are several specimens, without details of locality.

*Sinhalese name*.—Moralla (Colombo).

*Microphis*, mihi.

Brood organ of male abdominal, not covered by cutaneous folds, laterally protected by plates which correspond to the lower lateral edges of trunk and are ventrally divergent. Eggs small, numerous, isolated in open cutaneous cells. Upper as well as lower lateral edges of trunk and tail discontinuous; middle lateral edges of trunk continuous with lower ones of tail; keels of the several rings terminating in a free spine posteriorly. Scutella and lateral line present; D, A, C, and P present; A situated behind middle of total length.

2. *Microphis brachyurus*, Bleeker. Duméril, 1870, p. 595.

*Syngnathus brachyurus*, Bleeker, 1853, p. 16.

*Doryichthys brachyurus*, Günther, 1870, p. 184.

*Doryichthys Hasselti*, Kaup, 1856, p. 57.

*Doryichthys auronitens*, Kaup, 1856, p. 59; Günther, 1870, p. 182.

*Microphis auronitens*, Duméril, 1870, p. 597.

*Doryichthys millepunctatus*, Kaup, 1856, p. 60; Günther, 1870, p. 183.

*Microphis Bleckeri* (Day), Duméril, 1870, p. 599.

*Doryichthys Bleckeri*, Günther, 1870, p. 182; Day, 1878, p. 680, Pl. 174, fig. 3; Day, 1889, p. 465.

*Microphis douanii*, Duméril, 1870, p. 592.

Ann. 20–22 plus 21–23; ann. subdors. 1–2 plus 6–8; D 37–43, A 3–5, C 9, P 18–23. Operculum longitudinally keeled, with 1–8 radiating elevated ridges below the keel. Middle ray of C enlarged and somewhat elongate. Eggs small, in 4–13 longitudinal and 60–110 transverse rows. Total length up to 18.2 cm.; mature males 12.2–16.7 cm.

Ground colour dark, with numerous fine white dots. Operculum sometimes with black spots. Orange coloured and black spots at the corners of the mouth. Lower side of rostrum with light dark-edged transverse fasciæ. Caudal fin orange coloured at dorsal and

ventral margin. Male with a blood-red vertical stripe on the opercle near its hind edge ; a longitudinal stripe of the same colour immediately beneath the anterior half of the middle lateral edge, both these stripes disappearing in spirit. Iris brown, with golden lustre.

In fresh and brackish waters ; numerous amongst grassy weeds ; quickly and skilfully swimming.

*Distribution*.—From East Africa to Polynesia. Several specimens in the Colombo Museum, from the Panadure river at Horetuduwa, near Moratuwa, 4 miles upstream. In the Hamburg Museum (No. 11,557) 10 males, 34 females and young from the Gin-ganga and Opata-ela at Wakwella (Duncker), (No. 11,558) 3 males and 8 females from the Mahaweli-ganga, below Thalavai estate, near Trincomalee (Duncker).

*Sinhalese*.—Loku ela theliya (Wakwella) ; vetakeyiya moralla (Panadure) ; mudha aspaya (Negombo).

### *Doryichthys, mili.*

Brood organ of male abdominal, entirely covered, when filled with eggs, by broad, not coalescent, lateral protective plates, which sometimes have a narrow cutaneous fold along their free margin. Eggs large, isolated in cutaneous cells. Upper lateral edges of trunk and tail discontinuous, lower either continuous or discontinuous ; in the latter case middle lateral edges of trunk continuous with lower ones of tail. All the body edges smooth in the adult. Scutella and lateral line present. D, A, C, and P present ; A situated anterior to middle of total length. Fresh and brackish water fishes.

3. *Doryichthys cunculus*, H.B. Günther, 1870, p. 181 ; Day, 1878, p. 679, Pl. 174, fig. 4 ; Day, 1889, p. 465, fig. 166.

*Microphis cunculus*, Kaup, 1856, p. 64 ; Duméril, 1870, p. 591.

Ann. 17-18 plus 25-28 ; ann. subdors. 3 plus 7-8 ; D 50-53, A 3, C 9, P 18-20. Lower lateral edges of trunk and tail continuous ; middle lateral edges of trunk subcontinuous with lower ones of tail. Anal fin just in front of middle of total length. Protective plates of brood organ well developed ; no cutaneous folds found (pouch empty). Eggs rather large, according to the remnants of cells in 3-4 longitudinal and about 50-55 transverse rows. Opercle with a single longitudinal keel. Total length 13.9 cm.

Colouration grayish-brown ; several indistinct narrow dark longitudinal stripes on the side of the trunk. Diffuse dark spots on the upper lateral edges of trunk, most distinct on the ring borders. A dark stripe on each side from tip of snout through the eye over opercle, above its keel, to base of P ; ventral half of opercle silvery. Iris reddish-brown.

*Distribution*.—India (Malabar, mouth of Ganges, Bengal, Orissa), Ceylon.

Colombo Museum : one male from Panadure river at Horetuduwa. *Sinhalese*.—Vetakeyiyā moralla.

4. *Doryichthys ocellatus*, n. sp. Plate, fig. A.

Ann. 15–16 plus 31–32 ; ann. subdors. 1–2 plus 7–8 ; D 37–40, A 4, C 9, small, P 17–19. Lower lateral edges of trunk and tail discontinuous ; middle lateral edges of trunk continuous with lower ones of tail. Opercle with a straight keel ; beneath and parallel to the latter one, rarely two weaker ones, more distinctly visible in posterior half of opercle. Abdominal edge very prominent in females. Anal fin in front of middle of total length. Rings of adults smooth, of young ones spiny behind, as in *Microphis*. Caudal fin of young individuals comparatively large. Brood organ from second body ring to first caudal ring, with large, completely closing, but not coalescent protective plates ; no cutaneous folds. Protecting plates much deeper than dorsal wings of inferior lateral scutes. Eggs large, in 4 longitudinal and about 30 transverse rows. Total length up to 13 cm. ; mature males 9·5 to 13 cm.

On the middle lateral edges of the trunk, on each border of its rings, one black white-bordered ocellated spot, the white contour of which disappears in spirit. Back light reddish-brown, sides yellow-gray ; protective plates of brood pouch darker. A dark longitudinal stripe on each side from tip of snout through the eye to the opercle, behind which, more or less distinct, it passes on to the trunk between upper and middle lateral edge. Caudal with yellow dorsal and ventral margins. Iris yellowish-red.

The only two females of our material happen to be regenerated specimens ; in the one of 10·1 cm. length there are 24 caudal rings and 7 caudal fin rays (fin enlarged) ; in the other one of 9·5 cm. length there are 25 caudal rings and 8 caudal rays (fin enlarged). Evidently they have accidentally lost 6–8 caudal rings and yet been able to regenerate a caudal fin.

*Distribution*.—Ceylon.

Col. Mus. : one male from Kalu-ganga, near Galatura tea estate. 32 miles up river (H. Drummond Hay).

Hbg. Mus. 11,559 : one female, five young, from Mahaweli-ganga, below Thalavai estate, near Trincomalee (Duncker).

Hbg. Mus. 11,560 : five males, one female, four young, from Gin-ganga, at Wakwella (Duncker).

Nearly related to *Doryichthys caudatus*, Peters.

*Sinhalese*.—Punchi-cla theliya (Wakwella), mudha aspaya (Negombo).

*Corythoichthys*, Duncker.

Brood organ of male subcaudal, not covered, without lateral protective plates, bordered by narrow longitudinal posteriorly

divergent cutaneous folds. Eggs small, numerous, incompletely isolated in very shallow cutaneous cells, cake-like, sticking to each other. Upper lateral edges of trunk and tail discontinuous; lower lateral edges of trunk and tail continuous; middle lateral edges of trunk subcontinuous with upper ones of tail. Scutella and lateral line present. D, A, C, and P present.

5. *Corythoichthys conspicillatus*.

*Syngnathus conspicillatus*, Duméril, 1870, p. 544;  
Günther, 1870, p. 174; Day, 1888, p. 808; Day, 1889,  
p. 463.

*Syngnathus hæmalopterus*, Bleeker, 1853, p. 20.

*Corythoichthys fasciatus*, Gray; Kaup, 1856, p. 25.

*Syngnathus fasciatus*, Duméril, 1870, p. 543.

Ann. 16-18 plus 33-38; ann. subdors. 0-1 plus 5-7; D 25-32, A 3-4, C 9-10, P 14-18, annuli or rings in the region of the brood pouch (referred to as B R) 10-16. Middle lateral edges of trunk and upper ones of tail terminating near to each other, as a rule on the border between last ring of trunk and first of tail. Opercle with a straight keel in its entire length. Forehead and eyes prominent. Eggs small, numerous, in 6-11 longitudinal and 28-37 transverse rows. Total length up to 17.3 cm.; mature males 9.7-17.3 cm.

Ventral surface of head and opercles with dark longitudinal, of rostrum with dark transverse, fasciæ. A black transverse fascia ventrally on each of the first three body rings, frequently resolved into spots. All the rings with fine black reticulated lines.

During life the three black bands on the throat as well as the posterior margin of the anal opening seamed by orange colour. In the males light bluish-silvery stripes between the dark bands at the throat, missing or little developed in the females. Ground colour of ventral surface of head brassy-yellow to coral-red. Rostrum, upper edges of trunk, and subdorsal region wine-red, the latter with coral-red blotches. When not disturbed this fish moves snake-like on the bottom, but swims rapidly if disturbed. Frequent on coral sands.

*Distribution*.—From East Africa to Polynesia.

Col. Mus.: males and females, from Jaffna (Day-Haly, 1888).

Hbg. Mus. 11,563: two males, three females, from Trincomalee harbour (Duncker).

*Tamil*.—Kudira.

*Trachyrrhamphus*, Kp.

Brood organ of male subcaudal, without lateral protective plates, not covered, bordered by narrow longitudinal cutaneous folds, diverging posteriorly. Upper lateral edges of trunk and tail

discontinuous; lower lateral edges of trunk and tail discontinuous; middle lateral edges of trunk continuous with lower ones of tail. Scutella and lateral line present. D, A, C, and P present; C small; base of D elevated.

6. *Trachyrrhamphus serratus*, Schleg.

Kaup, 1856, p. 23; Duméril, 1870, p. 538.

Syngnathus serratus, Schlegel; Günther, 1870, p. 167;

Day, 1878, p. 677, Pl. 173, fig. 4; Day, 1889, p. 461, fig. 164.

Trachyrrhamphus cultrirostris, Peters, 1870, p. 710; Duméril, 1870, p. 539.

Trachyrrhamphus intermedius, Kaup, 1856, p. 24; Duméril, 1870, p. 538.

Syngnathus intermedius, Günther, 1870, p. 168; Day, 1878, p. 678, Pl. 173, fig. 6; Day, 1889, p. 462.

Syngnathus ceylonensis, Günther, 1870, p. 168.

Ann. 22-24 plus 44-49; ann. subdors. 2-4 plus 2-3; D 25-29, A 4, C 9-10, rudimentary, P 14-19, B R 20-22. Generally with short cutaneous appendages, similar to algæ, on the surface of the body, especially on the dorsal surface. Opercle with a very short basal keel and fine radiating striæ. Dorsal median line of rostrum with a serrated crest. Forehead and eyes prominent. Eggs very small and numerous, in 8-10 longitudinal series. Total length up to 26·8 cm. Uniformly brown coloured.

*Distribution*.—From Zanzibar to Japan.

Col. Mus.: 1 ♂, Ceylon.

*Urocampus*, Günth.

Brood organ of male subcaudal, with or without weak lateral protective plates, with broad longitudinal cutaneous folds, converging posteriorly and coalescent during the breeding period. Upper lateral edges of trunk and tail continuous; lower lateral edges of trunk and tail discontinuous; middle lateral edges of trunk continuous with lower ones of tail. Scutella and lateral line present. D, C, and P present, A (always?) absent; D commencing for more than its own length behind anal ring.

7. *Urocampus southwelli*, n. sp. Plate, figs. B (♂) and C (♀).

Ann. 8 plus 49-50; ann. subdors. 7 plus 12; D 14, A 0, C 10, well developed, P 8-10, B R 8, without protective plates. Opercle keeled in anterior two-thirds of its length. Body-edges very indistinct. Subdorsal tail-rings somewhat elevated. No cutaneous appendages. Rostrum longer than postorbital region of head. Eggs comparatively very large, biserial, 8-10, longitudinally arranged in seven anterior rings of B R—♂ 45 mm., ♀ 40 mm. Uniformly yellowish-brown.

From *U. guntheri*, mihi (W. Australia), with similar numbers of rings, distinct through the absence of cutaneous appendages, the greater length of D, and the shorter opercular keel.

*Distribution*.—Ceylon.

Col. Mus. : 1 ♂, 1 ♀, from Marichechukkaddi bay, in  $2\frac{1}{4}$  fathoms, in tow-net. (T. Southwell.)

### *Syngnathus*, L.

Brood organ of male subcaudal, generally with lateral protective plates, always with broad longitudinal cutaneous folds, converging and coalescent during the breeding period. Upper lateral edges of trunk and tail discontinuous; lower lateral edges of trunk and tail continuous; middle lateral edges of trunk subcontinuous with upper or with lower edges of tail.

#### 8. *Syngnathus spicifer*, Rüpp. ; var. *djarong*, Bleek.

*Distribution*.—Madagascar, India, Ceylon, Borneo, Java, Philippines, New Guinea.

Hbg. Mus. 11,561 : 3 ♂♂ from Opatha-ela, near Wakwella (Duncker).

Hbg. Mus. 11,562 : 11 ♂♂, 16 ♀♀, 21 juv. from Mahaweli-ganga, below Thalanaï estate, near Trincomalee (Duncker).

*Sinhalese*.—Eta theliya (Wakwella).

Among the forms united by Günther under the name of *Syngnathus spicifer* there are at least three to be distinguished, two of which may be considered salt and fresh water varieties of the same species, while the third one represents a separate species. They are :—

##### (a) *Syngnathus spicifer*, Rüpp. ; var. *gastrotaenia*, Bleek.

*Syngnathus spicifer*, Rüpp.—Kaup, 1856, p. 36 partim ;  
Duméril, 1870, p. 546 part ; Günther, 1870, p. 172  
part ; Day, 1878, p. 662 part, and Pl. 174, fig. 1 ;  
Day, 1889, p. 462 part ; Peters, 1869, p. 276.

*Syngnathus gastrotaenia*, Bleeker, 1853, p. 22.

*Syngnathus Kummii*, Bleeker ; Duméril, 1870, p. 548 ;  
Günther, 1870, p. 172.

Salt and brackish water.

##### (b) *Syngnathus spicifer*, Rüpp. ; var. *djarong*, Bleek.

*Syngnathus spicifer*, Rüpp. Synonyms see above, except  
Day, 1879, Pl. 174, fig. 1.

*Syngnathus djarong*, Bleeker, 1853, p. 22 ; Duméril,  
1870, p. 545.

? *Syngnathus Helfrichii*, Bleeker ; Duméril, 1870, p. 547.  
*Syngnathus spicifer*, Rüpp. ; var. *rivalis*, Peters, 1869,  
p. 276.

Brackish and fresh water.

(c) *Syngnathus argyrostictus*, Kuhl et Van Hasselt ; Kaup, 1856, p. 33 ; Duméril, 1870, p. 545.

*Syngnathus spicifer*, Günther, 1870, p. 172 part.

? *Syngnathus biserialis*, Gray ; Kaup, 1856, p. 33.

*Diagnoses of the two Species.*

*Syngnathus spicifer*, Rüpp.

Ann. 14-16 plus 38-43 ; ann. subdors.  $\div$  2-0 plus 6-9 ; D 23-30, A 2-3, C 10, P 13-18, B R 14-21. Middle lateral edges of trunk subcontinuous with lower ones of tail. Opercle keeled in its entire length. Sides of trunk without ocellated spots. Total length up to 15.4 cm.

*Distribution*,—From East Africa to Polynesia.

*Syngnathus argyrostictus*, Kuhl et Van Hasselt.

Ann. 15-16 plus 33-41 ; ann. subdors.  $\div$  1-0 plus 6-8 ; D 25-29, A 3, C 10, P 15-17, B R 16-19. Middle lateral edges of trunk subcontinuous with upper ones of tail. Opercle keeled in its entire length. Length of rostrum equal to distance of præorbital margin from base of P. Sides of trunk with numerous small white black-bordered ocellated spots in 3-7 longitudinal series. Total length up to 13.6 cm.

*Distribution*.—Malay Peninsula, China, Japan.

*Diagnoses of the Varieties of Syngnathus spicifer*, Rüpp.

(a) *Var. gastrotænia*, Bleek.

Rostrum longer than the remaining part of the head. Trunk rather deep, but without a particularly prominent abdominal edge. Abdomen with about 14 dark cross bars. Total length up to 15.4 cm. Mature males 10.0-15.4 cm.

(b) *Var. djarong*, Bleek.

Rostrum about as long as the postorbital length of the head. Trunk deep ; abdominal edge very prominent. Abdomen unicoloured, lighter than the bluish-black abdominal edge. Total length up to 14.1 cm. ; mature males 8.3-12.6 cm.

The formulæ of numbers of rings, &c., taken from 44 specimens of the first and 29 of the second variety are :—

(a) Ann. 14-15 plus 38-42 ; ann. subdors.  $\div$  2  $\div$  1 plus 7-9 ;  
D 25-30, P 14-18, B R 15-21.

(b) Ann. 14-16 plus 39-43 ; ann. subdors.  $\div$  2-0 plus 6-7 ;  
D 23-29, P 13-16, B R 14-17.

More distinctly these differences will come out from the corresponding average values :—

(a) Ann. 14-73 plus 39-81 ; ann. subdors.  $\div$  1-32 plus 7-41 ;  
D 27-61, P 16-37, B R 18-26.

(b) Ann. 14-79 plus 40-63; ann. subdors.  $\div$  0-53 plus 6-31;  
D 26-28, P 14-76, B R 15-06.

The dorsal fin of var. *djarong* therefore stands somewhat more forward and is shorter than that of var. *gastrotenia*, which latter has more pectoral rays and a larger brood pouch than the former. In both varieties the protective plates of the brood organ are very small, scarcely developed. Eggs of var. *djarong* small, in 4 longitudinal and about 60 transverse series.

Colouration of var. *djarong* during life:—Abdomen of male purplish-red, of female grayish-green, with blue-black abdominal edge. Ventral surface of rostrum and opercles silvery or brass-coloured, with blackish spots and stripes more or less irregularly arranged. C brown, with lighter dorsal and ventral margins. D with dark spots. Some specimens from the Mahaweli-ganga had the lip of the rostrum orange-coloured. Iris brass-coloured.

In New Guinea and the Bismarek Archipelago I collected var. *gastrotenia* at ten, and var. *djarong* at four localities, but once only found the two varieties together at the mouth of a draining ditch of a coconut plantation at the seashore; everywhere else the var. *gastrotenia* preferred the water more saline than the var. *djarong*.

### *Hippocampus*, L.

Brood organ of male subcaudal, without protective plates; its two cutaneous folds entirely united, forming a bag-like brood pouch, which has a small muscular orifice anteriorly, immediately behind the anal ring. Upper lateral edges of trunk and tail discontinuous; lower lateral edges of trunk and tail discontinuous; middle lateral edges of trunk continuous with lower ones of tail. Trunk compressed, generally deep. Head in an angular position to the longitudinal axis of trunk. No scutella; lateral line present. Scutes of body rings with narrow elongated wings and shortened keel. D, A, and P present, C absent; tail prehensile. Base of D elevated.

Of *Hippocampus* I have seen only three specimens from Ceylon, which seem to belong to two different species. It is impossible, however, at the present state of our knowledge to safely distinguish between the South Asiatic species of *Hippocampus*, with the single exception of *H. kuda*, Bleek. Characters traditionally applied, such as shape of the corona, of the spines of the body, colour, size of cutaneous appendages, are useless for the distinction of species; they vary considerably according to age and individuality, as I have convinced myself on larger series of the two European forms, *H. guttatus*, Cuv., and *H. brevisrostris*, Cuv.

## Description of the three specimens :—

Col. Mus. : ♂, ann. 11 plus 40; ann. subdors. 2 plus 1; D 18, A ?, P 19–18, B R 8. Rings subequal. Head and trunk with numerous fine white dots arranged in reticulated lines. Ceylon.

Col. Mus. : ♀, ann. 11 plus 38; ann. subdors. 2 plus 1; D 17, A 5, P 16. Rings subequal. Uniformly dark brown. Ceylon.

Hbg. Mus. : ♀, ann. 11 plus 37; ann. subdors. 2 plus 1; D 18, A 4, P 16. Rings subequal. Head and body with numerous fine white dots arranged in reticulated lines. Gulf of Mannar.

According to the number of caudal rings and of pectoral fin rays, which are systematically important, the two latter specimens may belong to the same, the former one to a different species; they certainly are not *Hippocampus kuda*, Bleeker. *Hippocampus guttatus*, Cuv. (cf. Günther, 1870, p. 202; Day, 1878, p. 682), is exclusively a European species, which is found from the Mediterranean to the North Sea. The synonym in the places cited above therefore is erroneous.

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## EXPLANATION OF PLATE.

A.—*Doryichthys ocellatus*.

B.—*Urocampus southwelli*, ♂.

C.—*Urocampus southwelli*, ♀.